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Complete Vehicle

Model: E83

Production: Start of Production MY 2004

OBJECTIVES

After completion of this module you will be able to:

- Recognize the X3
- Relate the differences between the X3, the X5 and E46 sportwagon
- Remove and reinstall X3 door handles and exterior mirrors
- Understand and Relate Panorama Sunroof Operation

E83 Complete Vehicle

Introduction

The E83, X3, conceived and engineered by BMW will be an addition to the X Family of SAV's. Based on the 3 Series Touring (Sportwagon), its size, weight and capabilities more closer match those of the X5.



TC003-3194

The chassis and many parts are taken either directly or in modified form from the E46/3-16 or the X5. Almost 35% of the parts were designed specifically for the X3.

By extending the X family, BMW is strengthening its leading position in the field of on-road-orientated four-wheel drive SAV's geared towards outstanding driving performance.

Production

Due to the outstanding success of all models none of the present-day BMW plants currently have sufficient capacity to produce the X3 in the intended quantities.

The BMW Group has therefore entrusted Magna Steyr with the development and production of the E83. The vehicle concept has been devised by BMW engineers in Munich while production-vehicle development and production take place in Graz/Austria.

Magna Steyr has already established a sound reputation with complete-vehicle developments as well as with body work or drive train developments.

It is above all in the 4WD sector that the Austrian's demonstrate an exceptional level of technical skill and competence.

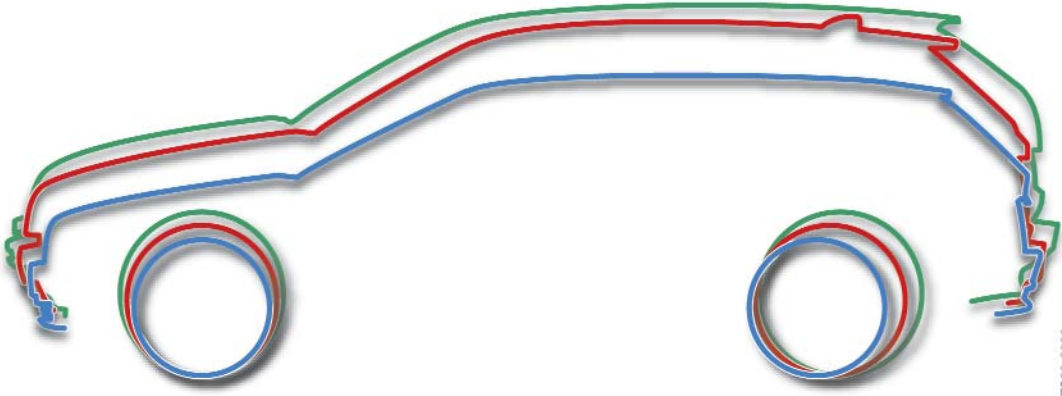
Even mass production is nothing new to Magna Steyr. All 4WD variants of the Mercedes E-Class, the Mercedes G-Model, the Chrysler Jeep Grand Cherokee and the Chrysler Voyager have been rolling off the production lines in Graz to some extent for years. Magna Steyr has regularly received the best marks in quality inspections and tests, carried out by among others J. D. Power.

Models

The X3 is available with the 3.0 M54 engine and two versions of the 2.5 liter engine, the M54. A six speed manual transmission is standard on all X3's with a 5-speed automatic optional.

Technical Highlights

- New four-wheel drive system with variable power distribution (xDrive)
- Multifunctional panorama glass sunroof
- Best-in-class ratio of power output and fuel efficiency



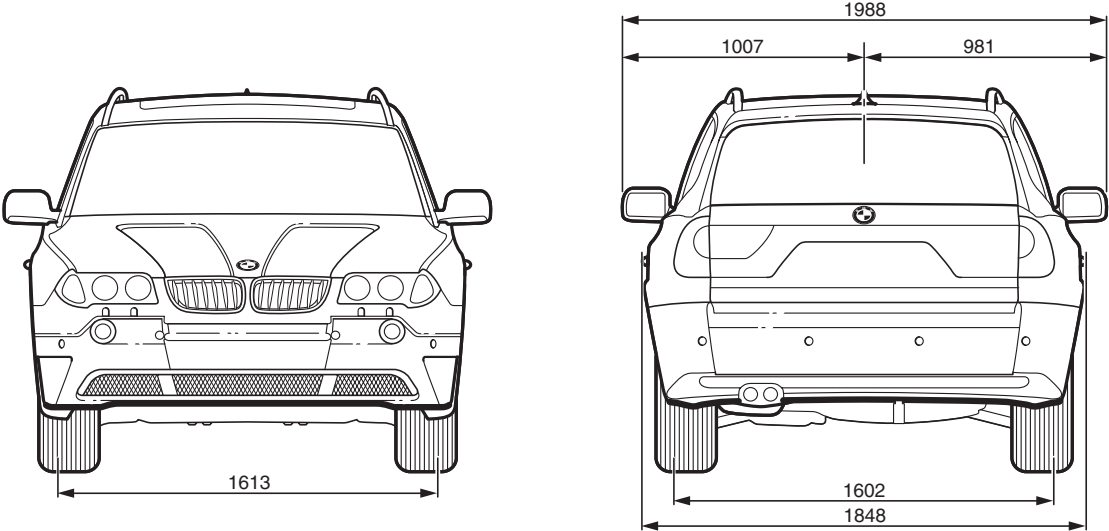
The X3 (Red) is significantly larger than the 3 Series Sportwagon(Blue), but only slightly smaller than the X5 (Green).

	E46/3 330XI Sportwagon	E83 X3 3.0i	E53 X5 3.0i
Length (mm)	4478	4563	4667
Width (mm)	1739	1848	1872
Height (mm)	1429	1631	1715
Empty Weight (kg)	1670	1730	2056
Payload	425	500	544
Luggage Compartment Capacity (L)	435-1345	480-1560	465-1550

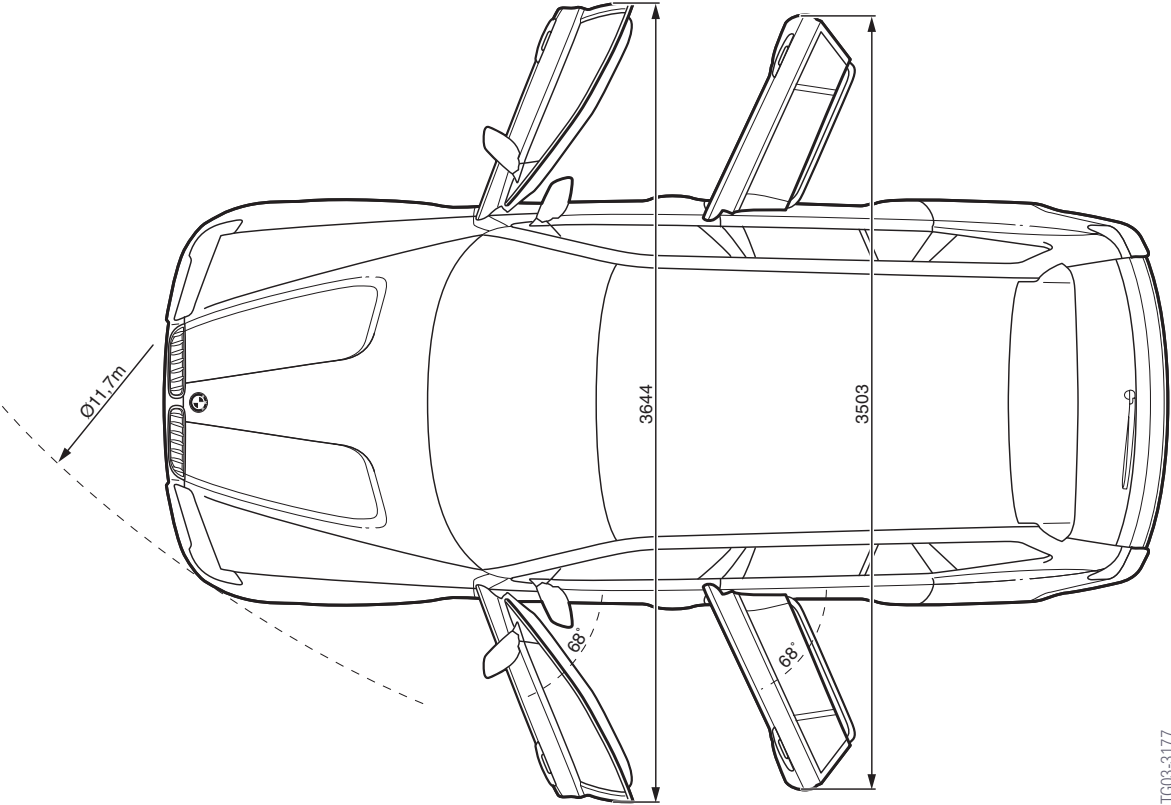
Vehicle Technical Data

	X3 2.5 M54	X3 3.0 M54
Engine	M54B25	M54B30
Cylinders/Valves	6/4	6/4
Capacity (cc)	2494	2979
Stroke/Bore (mm)	75/84	89.6/84
Output (kw) At Speed (RPM)	141@6000	170@5900
Maximum Torque (Nm) At Speed (RPM)	245@3500	300@3500
Compression	10.5:1	10.2:1
Motor Electronics	MS45	MS45 MS45.1 w/auto
Fuel Type	Unleaded RON98	Unleaded RON98
Maximum Engine Speed (RPM)	6500	6500
Manual Transmission	ZF GS6X37BZ	ZF GS6X37BZ
Automatic Transmission	GM GA5R390R	GM GA5R390R
Empty Weight (kg)	1707	1730
Maximum Load (kg)	500	500
Wheels	7J17 Cast Al. ET39 Styling 110	8J17 Cast Al. ET46 Styling 112
Tires	215/60R17 96H M+S	235/55R17 99H M+S
0-100km/h (Manual/Auto)	-/10.0	7.9/8.3

Vehicle Data Views

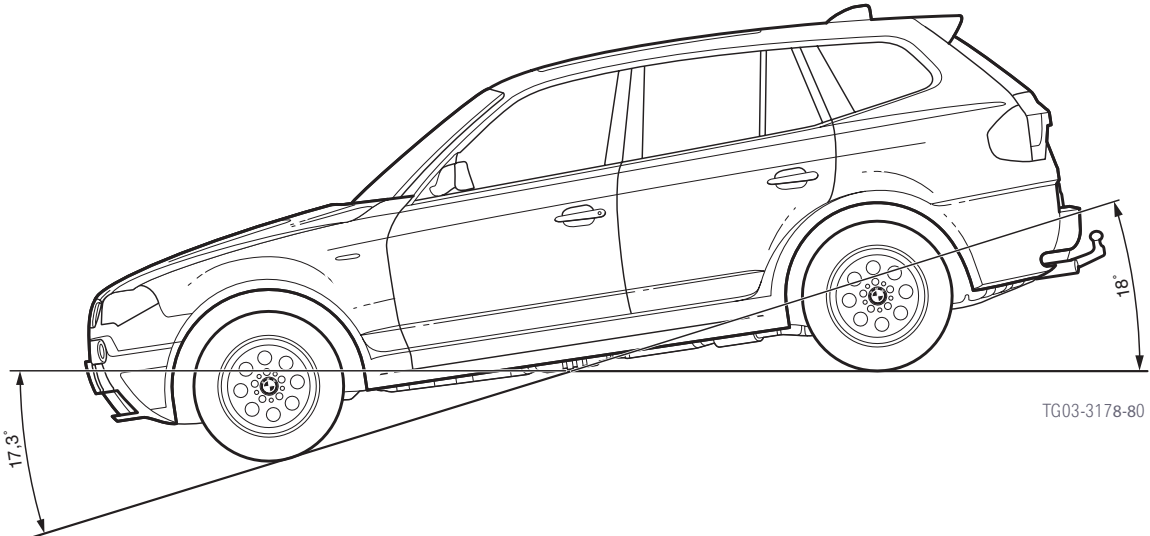
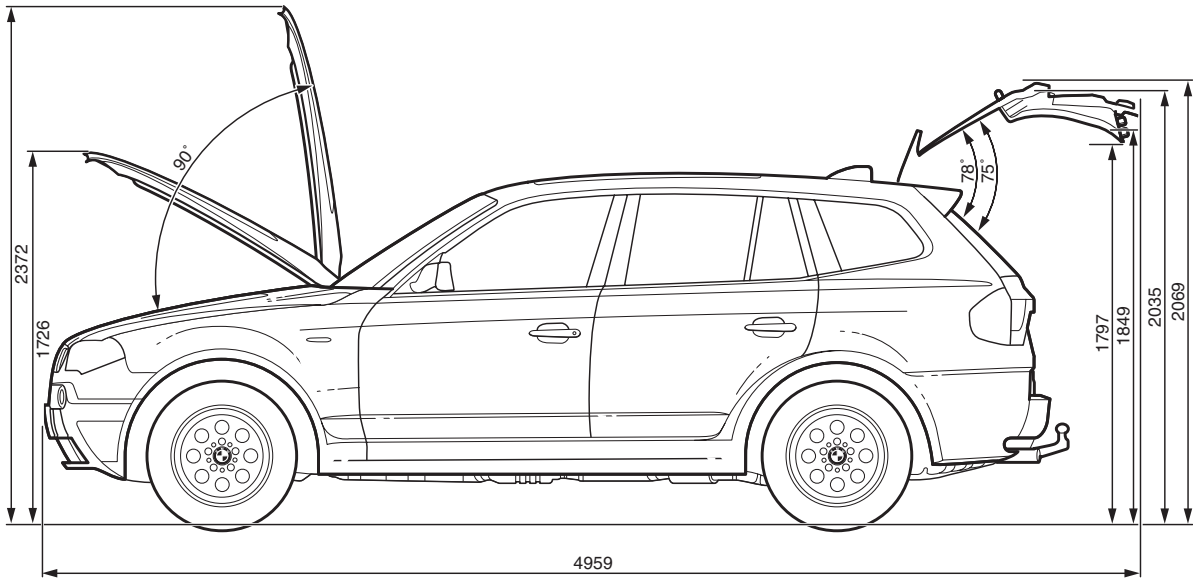
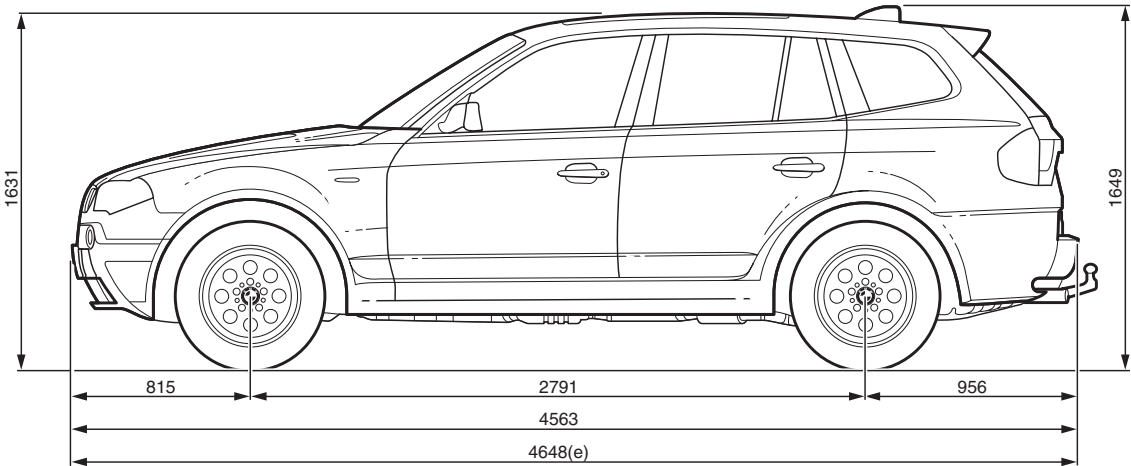


TG03-3176



TG03-3177

Vehicle Data Views



TG03-3178-80

Body

The X3 is derived from the E46 sharing many identical parts but is much heavier. Various reinforcement measures were necessary to guarantee the required level of rigidity - even in the event of a crash.

Thus the front axle (2-joint spring strut as in the X5) is bolted at 8 points, the front end is stabilized with a suspension cross-brace (load factor higher than for the M3), seat cross-members and reinforcement plates in the B-pillars provide additional protection in the event of a side impact and the rear engine brackets are made of high-tensile but light "Trip 700" steel.

The engine in the E83 is lower than in the E46. To ensure sufficient clearance for the manifold heat shield, the left engine bracket is shorter than the right.

The hood has a side support to prevent it from moving in the event of a crash. Held in place in this way, the hood cannot jump out of its anchoring to damage the windshield.

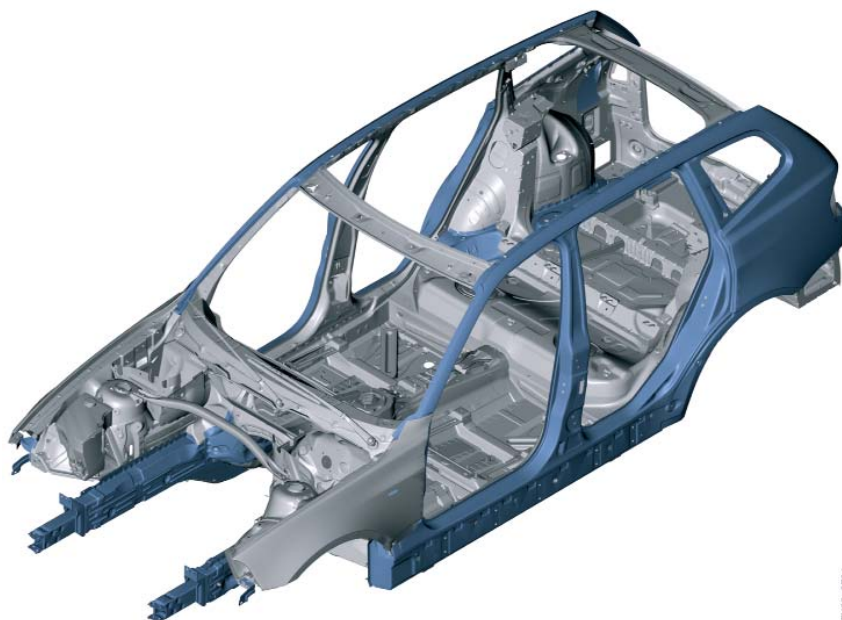
Body Shell

The Bodyshell panels are stamped and assembled at Magna Steyr.

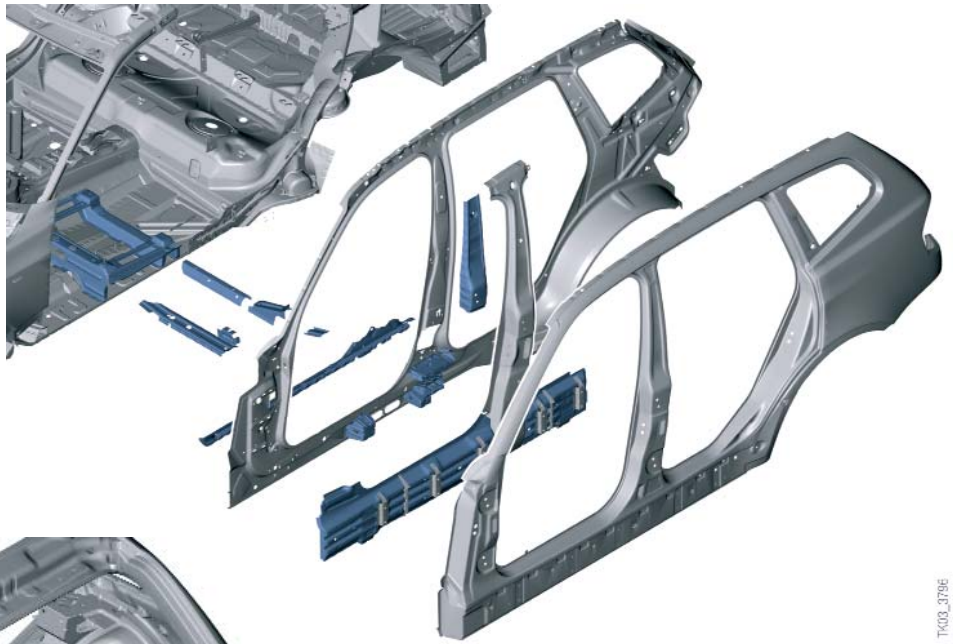
Since the bodyshell is made completely of steel, there are few new procedures to observe with regards to repair and replacing parts of the body.

To reduce weight, the front bulkhead (radiator support) of the X3 is made of a hybrid steel injection-molded with plastic. The air ducts are cast on. In the case of an accident this bulkhead must be replaced rather than repaired.

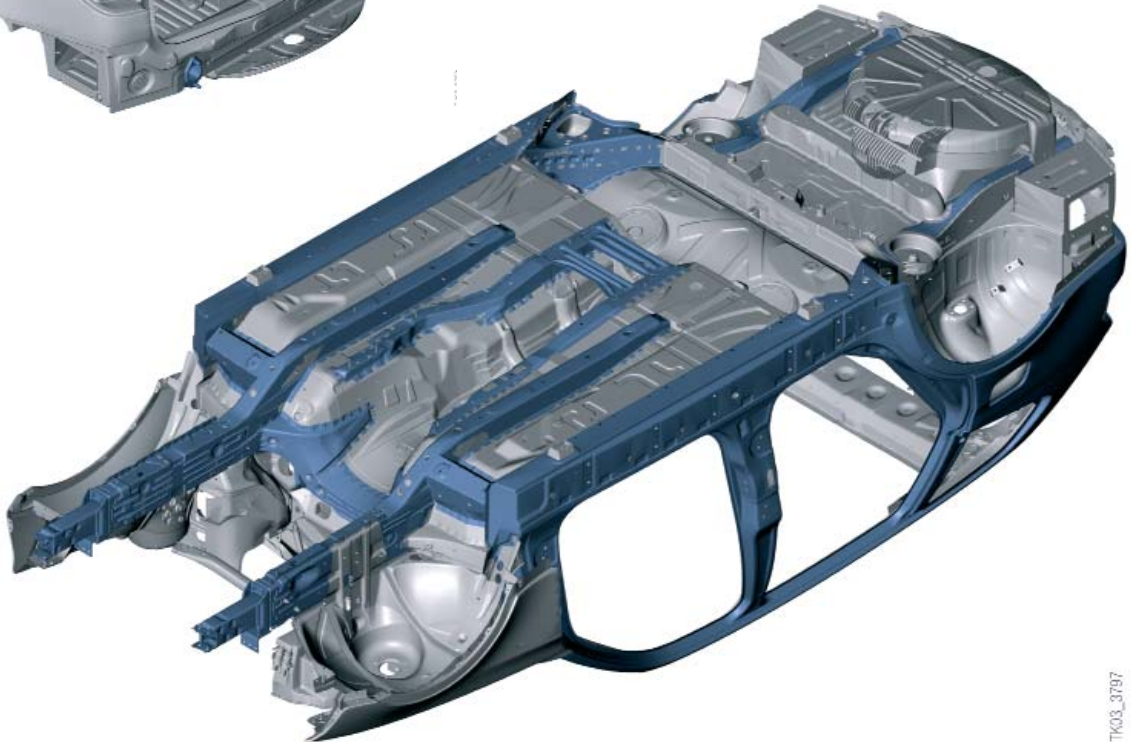
The static rigidity of the X3 body is 20,000Nm/degree.



TK03_0724



TK03_3796



TK03_3787

Front Bumper

The front bumper assembly consists of a 2 part panel, the support member and the deforming elements.

The two panels are made of plastic and clipped and bolted together. The panels must be removed from the X3 individually with the outer panel being removed first.

Attached to the chassis is the aluminum support member and deforming elements.



Front Bumper Assembly



Headlights



Front Lights

Halogen headlights are standard, bi-xenon with AHL optional. The headlights are mounted to the forward bulkhead with 4 screws.

The fog lights are installed in the bumper trim and have adjustment screws accessible from the outside (front).

Doors

The door panels are attached with 5 screws. The trim on the pull handle must be removed to access the screws.

The outside mirror is held to the door by 3 screws, the cover and mirror are clipped to the mirror assembly.



Outside Mirrors

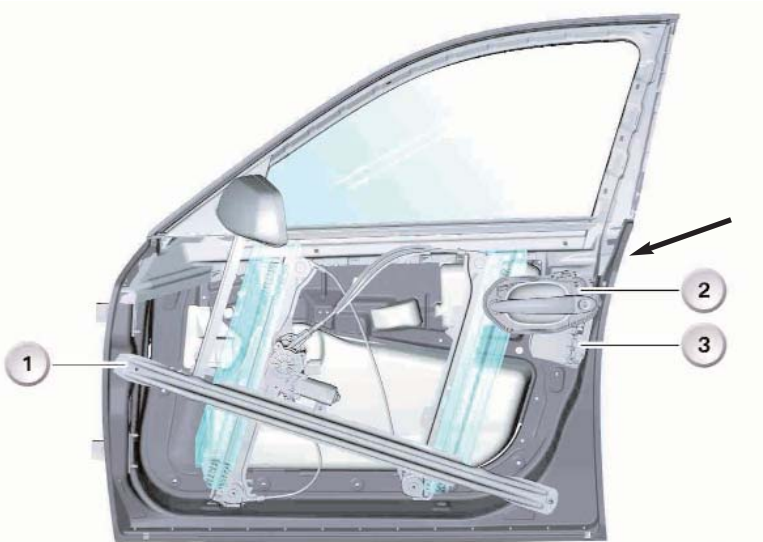


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Exterior Door Handles

The exterior door handle is a three-piece assembly. It consists of a mounting plate fitted from the inside, a handle recess plate fitted from the outside and the handle fitted and screwed onto the recess plate from the outside (access screw from outside - arrow).

- 1. Diagonally mounted side-impact bar
- 2. Exterior door handle mounting plate with door handle and recess plate
- 3. Lock



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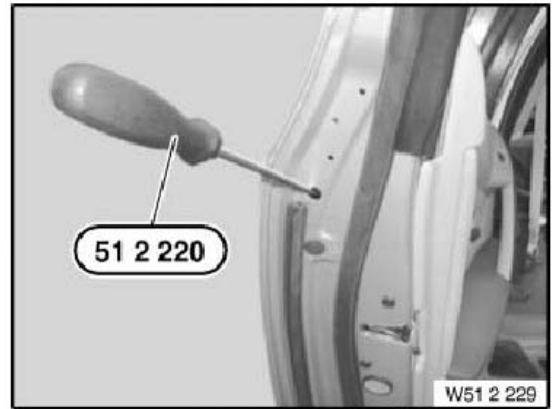


Workshop Exercise - Exterior Door Handle Removal

The Instructor will demonstrate the proper door handle release and attachment procedure using mockup parts and special tool. This will familiarize you before attempting “on vehicle” removal. After the demonstration is completed, proceed to “on vehicle” removal and installation.

Caution: Lift handle until access hole (to screw) is exposed and insert tool to engage in screw, do not overtighten securing screw in either direction!

1. To remove door handle, turn screw counterclockwise against stop. Pull rear of handle up, pivot and pull handle off of front pin.
2. To install handle, position on front pin and swivel into place. Push rear of handle into socket (lightly) until it snaps in (slight resistance). Turn screw clockwise until it seats.



Remove tool, release door handle.



Workshop Exercise - Replace Painted Mirror Cover

The customer complains that the mirror cover is scratched. The correct color cover has been ordered and received and now must be installed.

1. Is it possible to remove the painted cover without removing the mirror glass?

2. What is the proper procedure to remove the mirror glass?

3. What is the final step in removing the painted mirror cover?

Interior

The use of forms on the outside is continued on the inside. The X3 is characterized by modern styling down to the last detail (e.g. inwardly turning surfaces on the door handle) and a strong lifestyle direction. The two-tone color scheme and horizontal shapes convey lightness of touch, power and dynamics. Thanks to the use of diverse materials ranging from sporty aluminum to elegant leather or wood, ample freedom is given a high level of individualization.

The interior concept has taken into account the specific demands made of an SAV. A rear bench seat for three rear passengers ensures that up to five persons can sit comfortably in their seats in the X3. Knee room of 61 cm provides particular comfort on top of the fold-out rear center armrest.

The wide range of practical storage options, stowage compartments and mounting options in the passenger and luggage compartments can be extended still further with the option "storage package."

The X3 is fitted as standard with 4 cup holders, map pockets with nets in the front doors and a 4.5-liter glovebox. The storage package features among others additional nets for the front and the luggage compartment, mounting rails with variable lashing points and a nonslip revolving floor for the luggage compartment.

The luggage compartment capacity up to the height of the removable interior lid is 480 liters and with the rear bench seat folded down up to the height of the window edge is 930 liters. When the vehicle is loaded up to the height of the roofliner, a volume of 1560 liters becomes available. The single-part tailgate opens upwards, the loading sill is low and the rear bench seat can be folded in a ratio of 60 : 40.

For carrying sports or leisure equipment, the list of options includes a ski bag, a holder for mountain bikes (up to two can be stowed inside the vehicle) and a roof rack.



Heating/Air Conditioning System

The heating and air conditioning systems are derived from the E46 and are adapted geometrically to the body of the E83.

Communications/Entertainment

All the technical highlights familiar to BMW can also be ordered for the X3. Park Distance Control, cut-off ultrasonic interior movement detector, bi-xenon headlights and the recently introduced adaptive headlight are featured in the list of optional extras.

Hi-Fi and navigation systems (with pop-up monitor and DVD) and the telecommunications system (Bluetooth interface) represent cutting edge technology. The CD changer - for the first time in a BMW - is integrated in the center console for particular ease of use.



Panorama Glass Sunroof

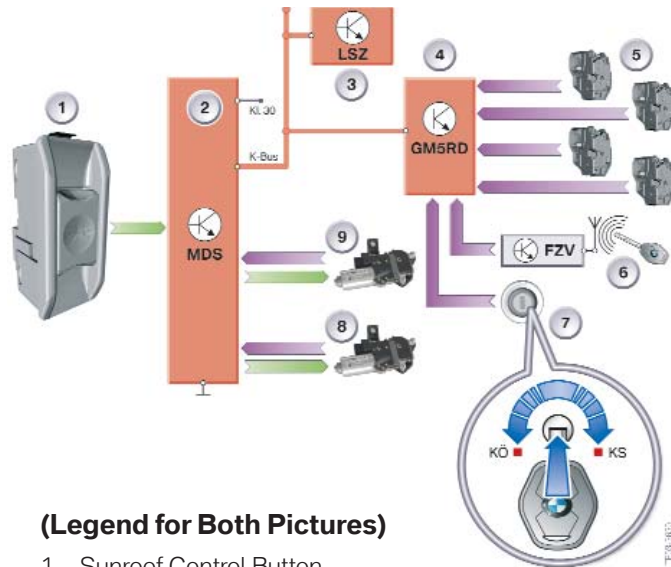
One of the highlights of the X3 is a fully automatic, two-part panorama glass sunroof with an area of almost one square metre. Its front window section can be fully opened while both window sections can also be tilted rearward. The panorama glass sunroof affords an outstanding view for the rear occupants and, when fully opened, lends the vehicle the impression of being almost a Convertible.



System Components

The panorama glass sunroof assembly consists of the following components:

- Panorama Glass Sunroof control unit, MDS
- 2 Drive Motors
- 2 Part floating headliner
- 2 Glass covers
- Power Supply
- K-Bus Interface
- Wind deflector



(Legend for Both Pictures)

1. Sunroof Control Button
2. MDS
3. LSZ
4. GM5RD
5. Door Contacts
6. FZV
7. Driver's Door Lock
8. Motor
9. Motor

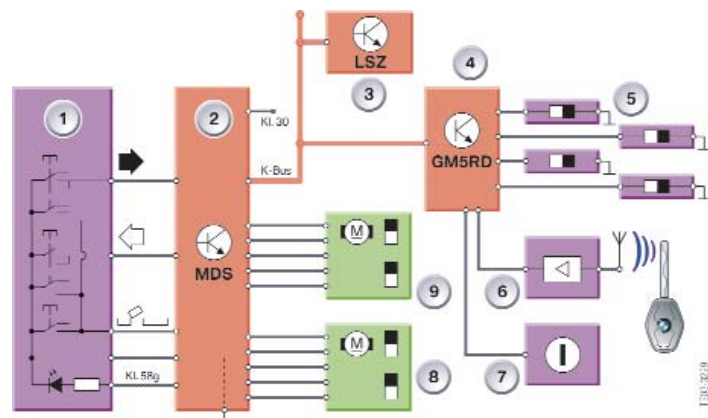
MDS

The MDS is a further development of the slide/tilt sunroof module fitted to the E 65.

The MDS contains the following components:

- Control Electronics
- K-Bus Interface
- Drive motor Relay
- Hall Sensor Power Supply

The drive motors are connected to the MDS by a 10 pin connector. The remaining components are connected via a 16 pin connector.



Drive Motors

The motor is a DC motor. The hall sensors are integrated in the motors to detect motor revolutions. These signals are forwarded to the MDS for analysis.



Floating Headliner

The floating headliner consists of two parts controlled by a Bowden Cable.

The headliner is interlocked to the function of the glass roofs. The headliner must be opened before the glass sunroof will open. On closing the glass sunroof must be closed before the headliner can be closed.

Glass Covers

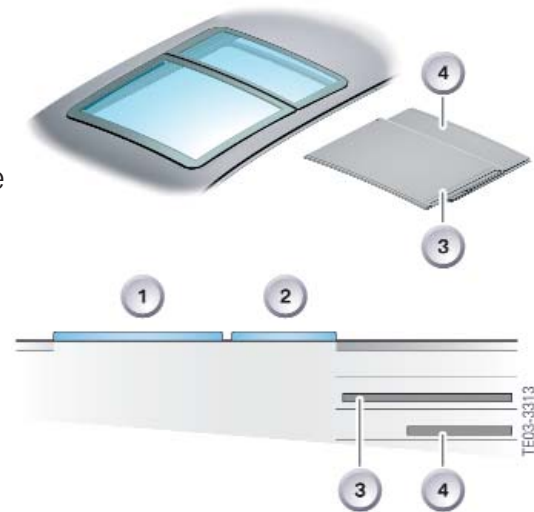
Two glass covers are installed in the panorama sunroof. Six bolts secure the front glass to the frame and four bolts secure the rear glass.

Power Supply and K-Bus Interface

The MDS acts as the power supply module for both the sunroof motor and the headliner motor. Communication with the rest of the car is through the K-Bus. The MDS receives and transmits K-Bus messages.

Wind Deflector

The wind deflector is cable operated by the rear (headliner) motor.




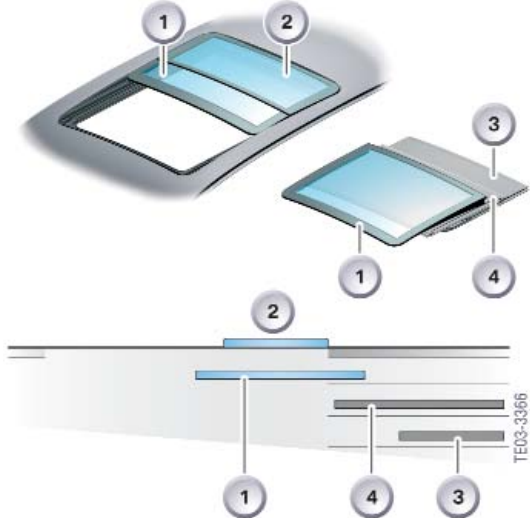

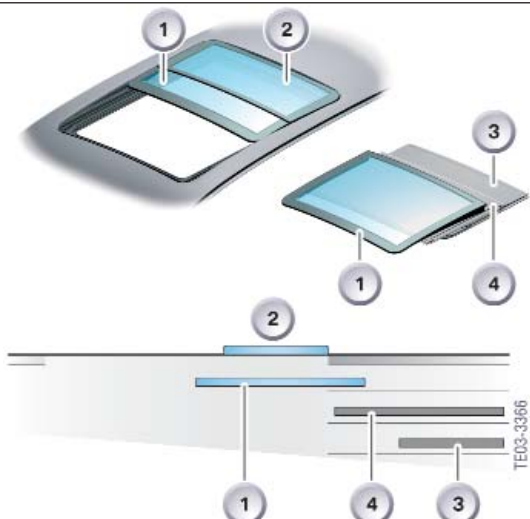

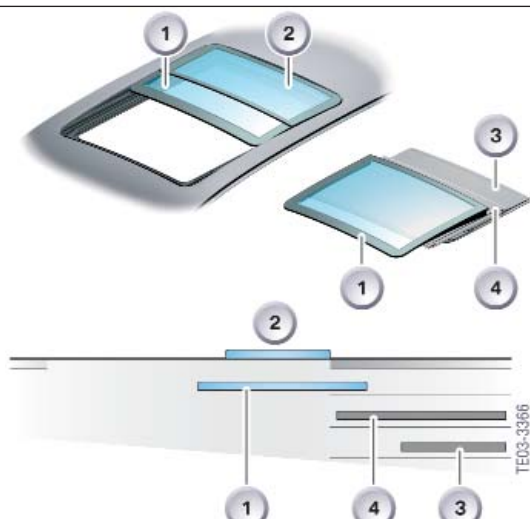
1. Front glass sunroof
2. Rear glass sunroof
3. Front Floating Headliner
4. Rear Floating Headliner


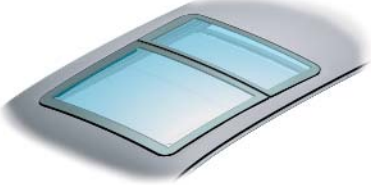
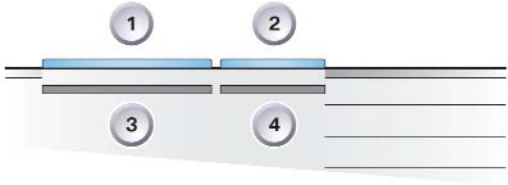

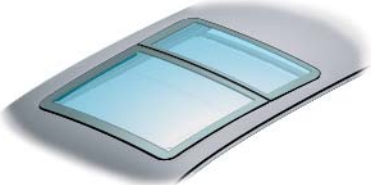
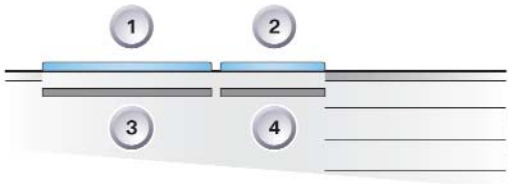

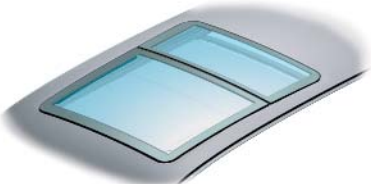
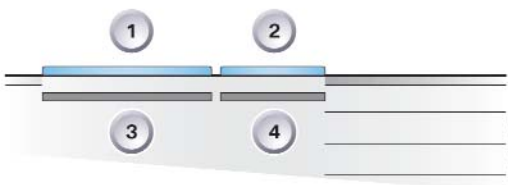
System Operation


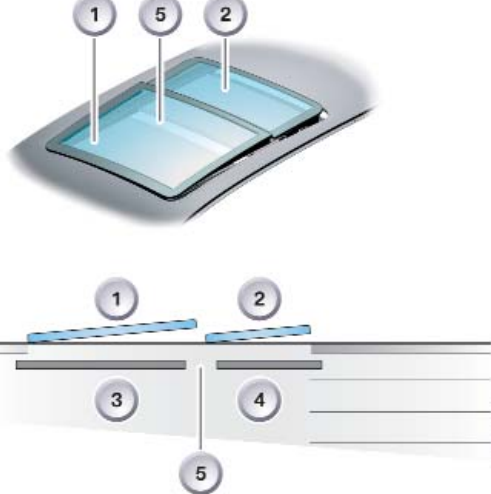

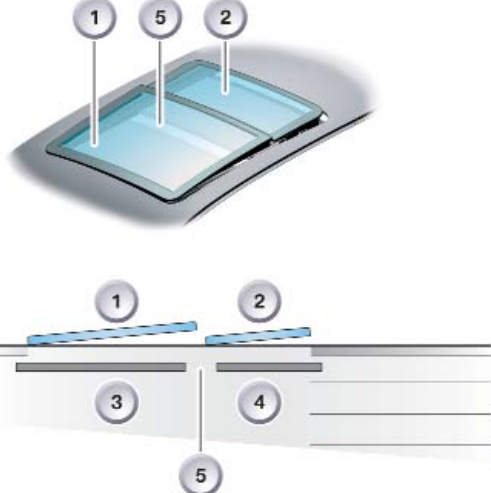

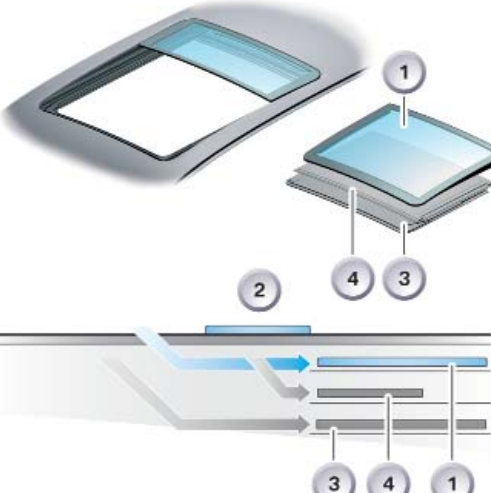
Operation of the panorama sunroof is similar to the conventional slide/tilt sunroof. It functions both as a tilting sunroof and a slide/tilt sunroof. The rear glass only tilts, the front glass slides and tilts. Rear tilt is possible only when the front glass is also tilted. The GM5RD signals the MDS for convenience opening and closing of the panorama glass sunroof.

The panorama glass sunroof is operated as follows:

- Headliner and glass sunroof Closed.
- Headliner closed, front and rear glass in tilt position (Headliner goes to vent position).
- Headliner open, sunroof closed.
- Headliner open, sunroof opened manually.
- Headliner open, sunroof opened to comfort position (Via one touch opening).
- Headliner open, sunroof opened fully (Beyond comfort position).

Control Button	Movement	Panorama Glass Sunroof Positions
<p>1</p>  <p>Manual opening of panorama glass sunroof by sliding button to first detente position</p>	<p>Floating headliner of glass tilt sunroof and slide/tilt sunroof are opened until the control button is released.</p>	
<p>2</p>  <p>Automatic opening of panorama glass sunroof by sliding the button beyond the pressure point to the second detente position</p>	<p>Panorama glass sunroof is automatically opened to the comfort position.</p>	
<p>3</p>  <p>Double-click function</p> <p>Automatic opening of panorama glass sunroof by sliding the button twice beyond the pressure point to the second detente position</p>	<p>Panorama glass sunroof is automatically opened to the comfort position.</p>	

Control Button	Movement	Panorama Glass Sunroof Positions
<p>4</p>  <p>TE03-3371</p> <p>Manual closing of panorama glass sunroof by sliding control button in first detente position</p>	<p>Floating headliner or glass tilt and slide/tilt sunroofs are closed until the control button is released</p>	  <p>TE03-3312</p>
<p>5</p>  <p>TE03-3373</p> <p>Automatic closing of panorama glass sunroof by sliding the button beyond the pressure point to the second detente position</p>	<p>Floating headliner or glass tilt sunroof or slide/tilt sunroof are fully closed</p>	  <p>TE03-3312</p>
<p>6</p>  <p>TE03-3372</p> <p>Double-click function</p> <p>Automatic closing of panorama glass sunroof by sliding the button twice beyond the pressure point to the second detente position</p>	<p>Floating headliner and glass tilt sunroof or slide/tilt sunroof are fully closed</p>	  <p>TE03-3312</p>

Control Button	Movement	Panorama Glass Sunroof Positions
<p>7</p>  <p>TE03-3374</p> <p>Manual opening of panorama glass sunroof by pressing control button to first detente position</p>	<p>Panorama glass sunroof is opened to raised position until the control button is released</p>	 <p>TE03-3365</p>
<p>8</p>  <p>TE03-3375</p> <p>Double-click function</p> <p>Automatic opening of panorama glass sunroof by pressing the button beyond the pressure point to the second detente position</p>	<p>Panorama glass sunroof is fully opened to raised position and the floating headliner is moved to the vent position.</p>	 <p>TE03-3365</p>
 <p>TE03-3368</p> <p>After opening panorama glass sunroof via one touch, the sunroof may be opened fully (rather than the comfort position) by sliding the control button to the first detente and holding.</p>	<p>Front glass of panorama sunroof will move from comfort position to fully open position.</p>	 <p>TE03-3364</p>

Floating Headliner

Opening

On opening the front part of the headliner moves over the rear part of the floating headliner. The special feature of the floating headliner is that it can be opened fully without the sunroof being open or tilted.

Vent Mode

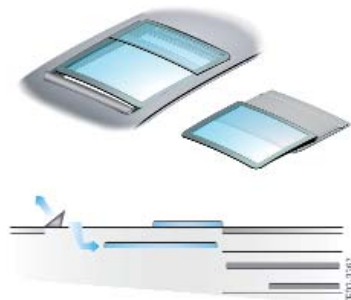
When the panorama glass sunroof is moved into the tilt position, the floating headliner is moved into the vent position.

The vent position reduces the suction effect at high road speeds.



Wind Deflector

The wind deflector is regulated according to road speed. When the sunroof is opened the wind deflector remains in the down position until road speed is seen by the MDS. Then the wind deflector is placed in the extended position. At roads speeds greater than 140km/h (84mph) it is retracted to an intermediate position. If the road speed drops below 100km/h, the wind deflector is again raised.



Initialization

Initialization must be performed on the panorama glass sunroof anytime the MDS loses positioning of the glass panels or the headliner or if the any component of the sunroof assembly is replaced.

The control button is pressed and held in the position to tilt the sunroof. Initialization begins approximately 15 seconds after pressing the button. The initialization process may take over 2 minutes to perform.

Note:

The control button MUST be held in the tilt position during the entire initialization process. Failure to hold the button will result in the initialization procedure to be cancelled.

During initialization the panorama sunroof will operate as follows:

- Both sunroof panels enter tilt position(Headliners enter Vent Mode)
- Both Headliners open
- Both sunroof panels lower
- The front sunroof panel opens then closes
- Both Headliners close

Anti-Trapping Protection

Both the covers and the floating headliners are fitted with anti-trap protection. If the MDS detects something in the path, the appropriate motor is stopped and activated in the reverse direction.

Service Notes

The motors may be replaced individually. An initialization procedure is required after replacing one or both of the motors

The MDS control unit may be replaced separately. The panorama glass sunroof must be recoded and initialized after MDS replacement.



Workshop Exercise - Panorama Glass Sunroof

The customer has complained of a stained rear sunroof headliner. The sunroof headliner has been received, and now must be replaced. However when the vehicle arrives in the shop, the headliner will not operate.

1. Check fault memory and list any faults. _____

2. Is there a Test Plan for this situation? _____

3. Perform the Test Plan. _____

4. Which section of the Test Plan best fits this situation?

5. From where does the headliner motor receive its power?

6. What is the easiest place to check the power supply to the headliner motor? _____

Check power for visor motor at MDS. _____

7. Is B+ available at the headliner motor? _____

8. Repair the fault. _____

9. List the steps necessary to remove the rear headliner.

10. List the movement of the sunroof and headliner during initialization.
